

# Annapolis Prepares for Rising Seas

## *History Meets the Future*



John Englander  
St. John's College  
January 30, 2016



Credit: Don Boesch

# Hurricane Isabel - 2003



Credit: Don Boesch



Credit: Rebecca Flora

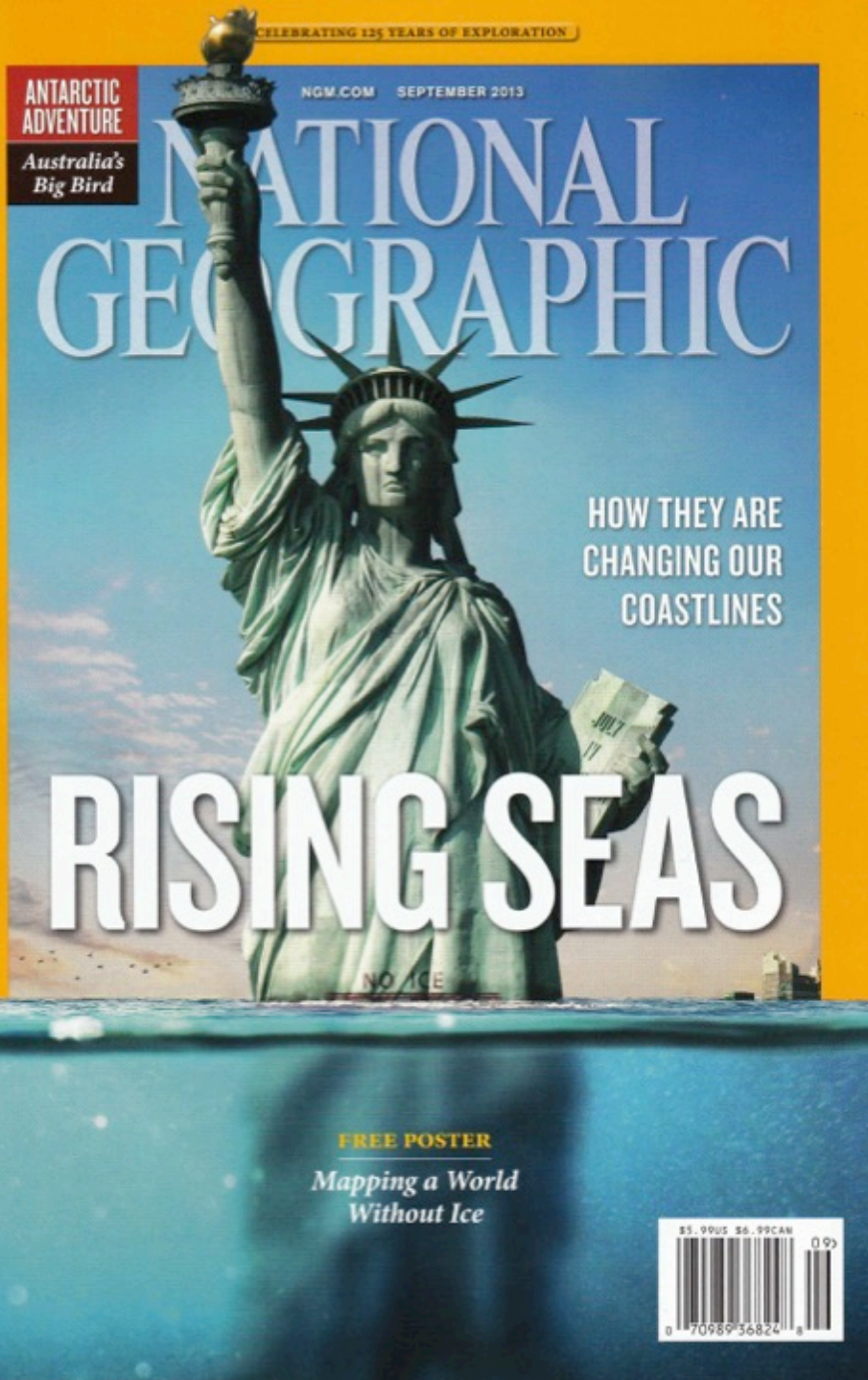


Credit: Rebecca Flora





Credit: Rebecca Flora



Sea Level change is  
“new.”

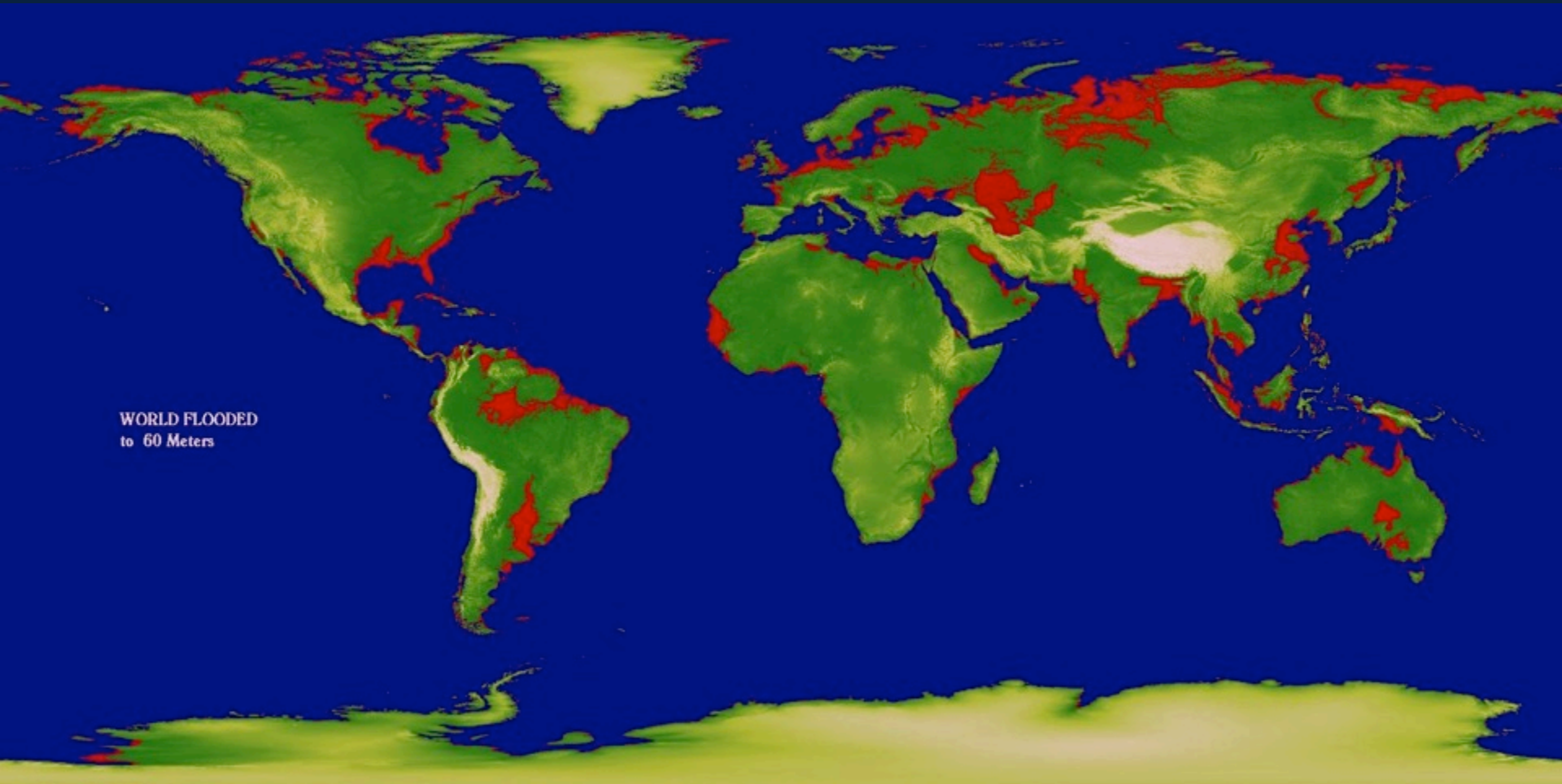
Barely changed in  
5,000 years.

Last time it was  
higher was  
120,000 years ago.





# Global vulnerability



# Military Bases







Paul Krashefski, Broward County

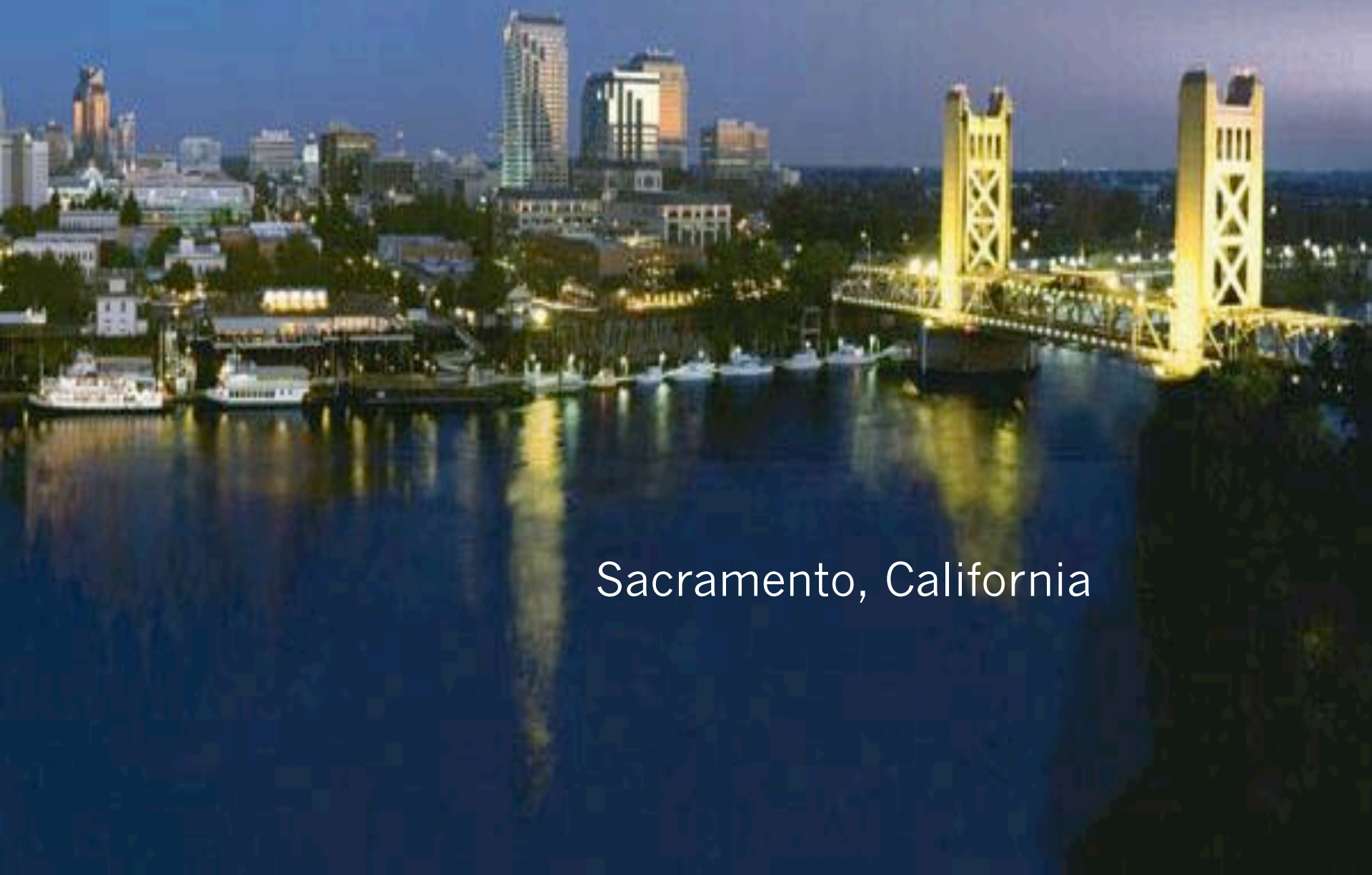


Paul Krashefski, Broward County



Paul Krashefski, Broward County

On tidal rivers.....100 miles inland



Sacramento, California

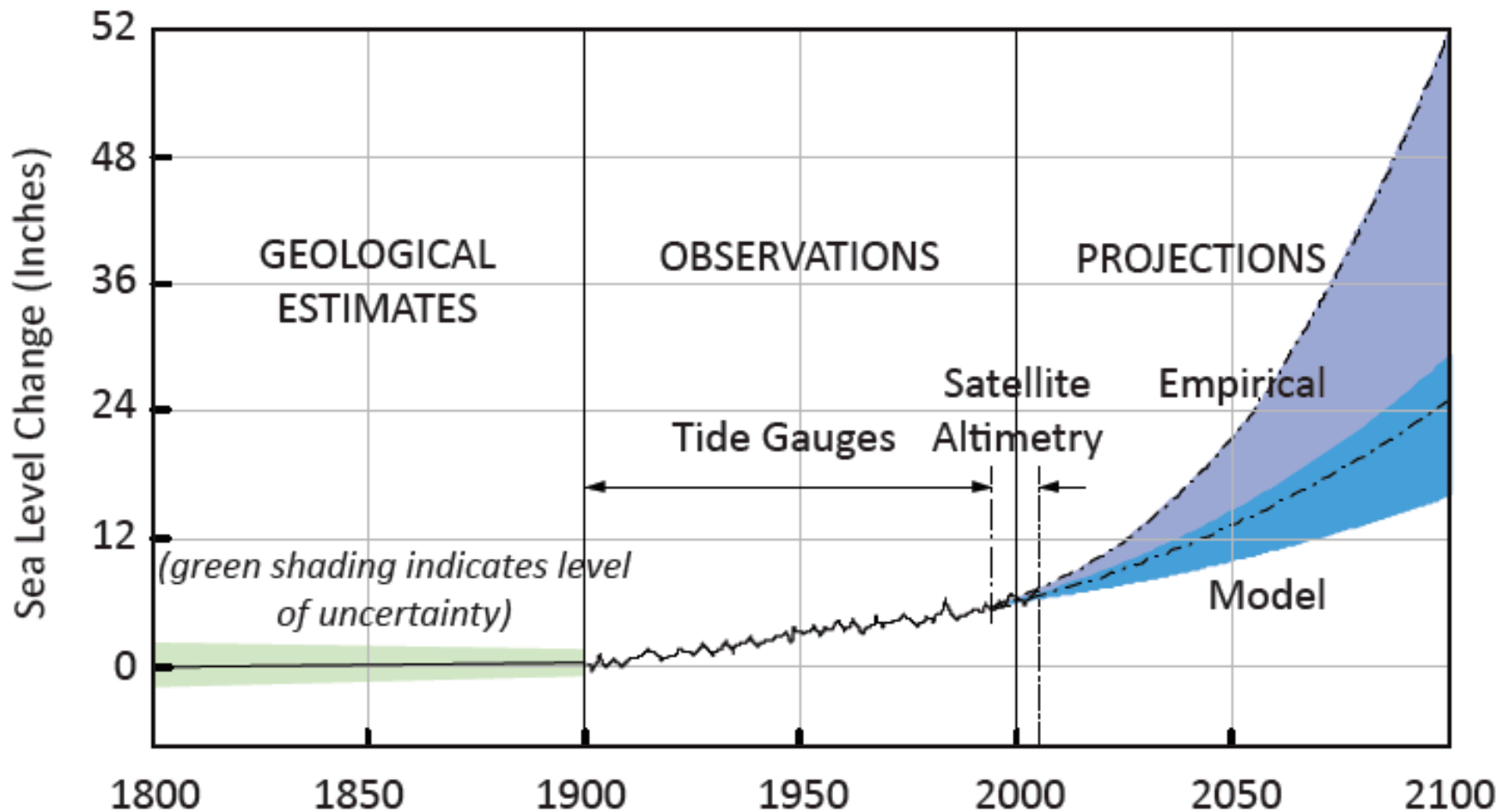


Credit: Don Boesch



There is a range to the projections

Reality is exceeding the projections



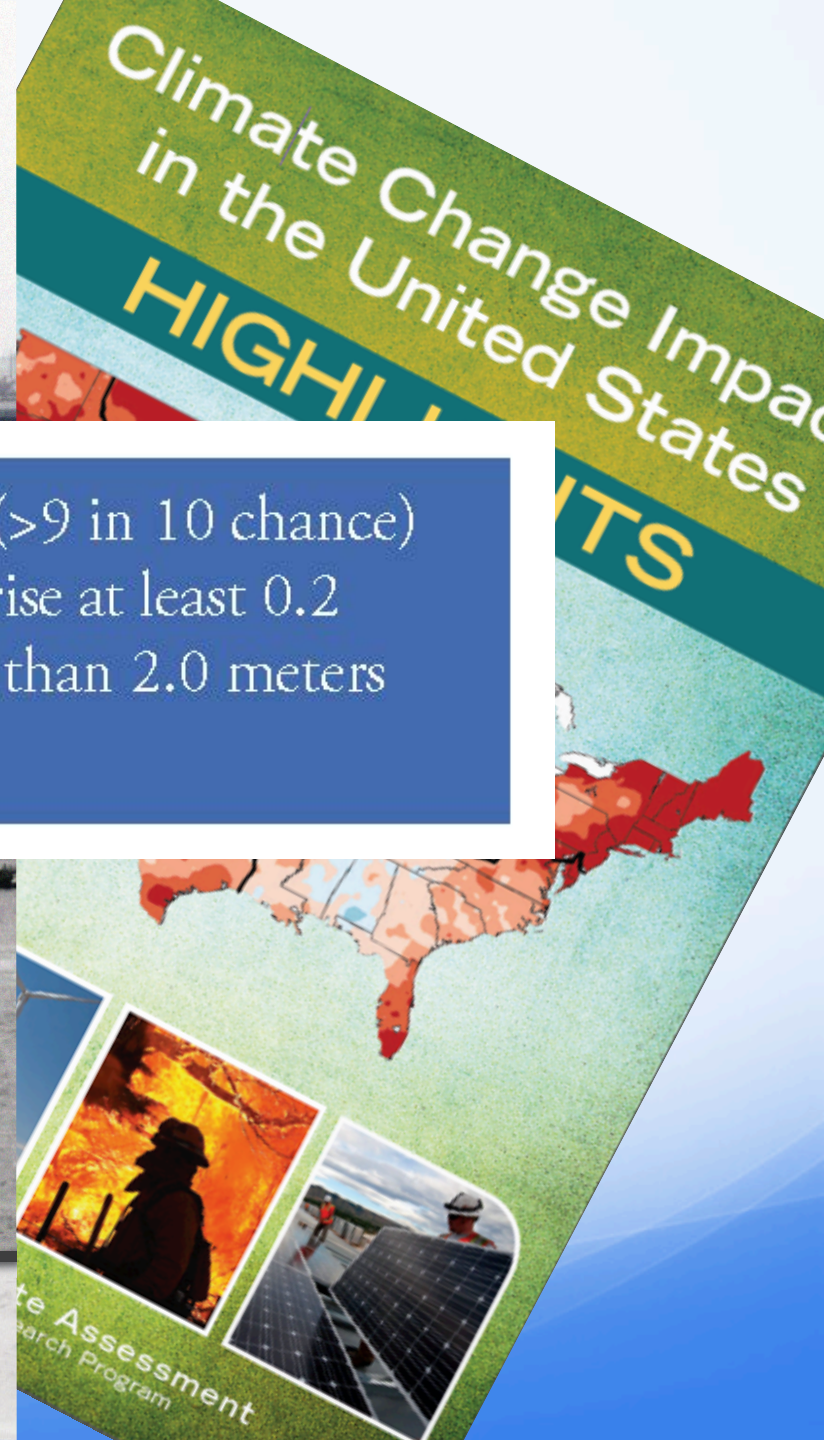
# Global Sea Level Rise Scenarios for the United States National Climate Assessment

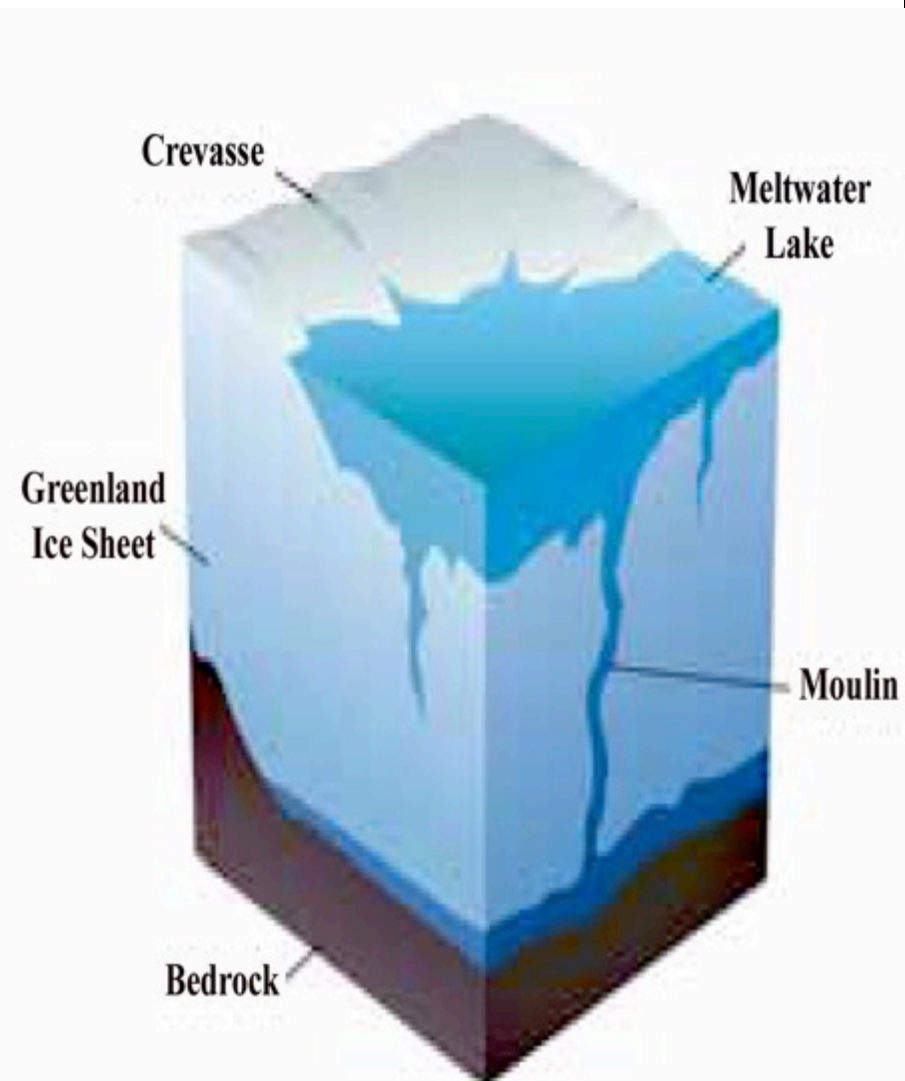
December 6, 2012

We have very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100.



US Army Corps  
of Engineers.

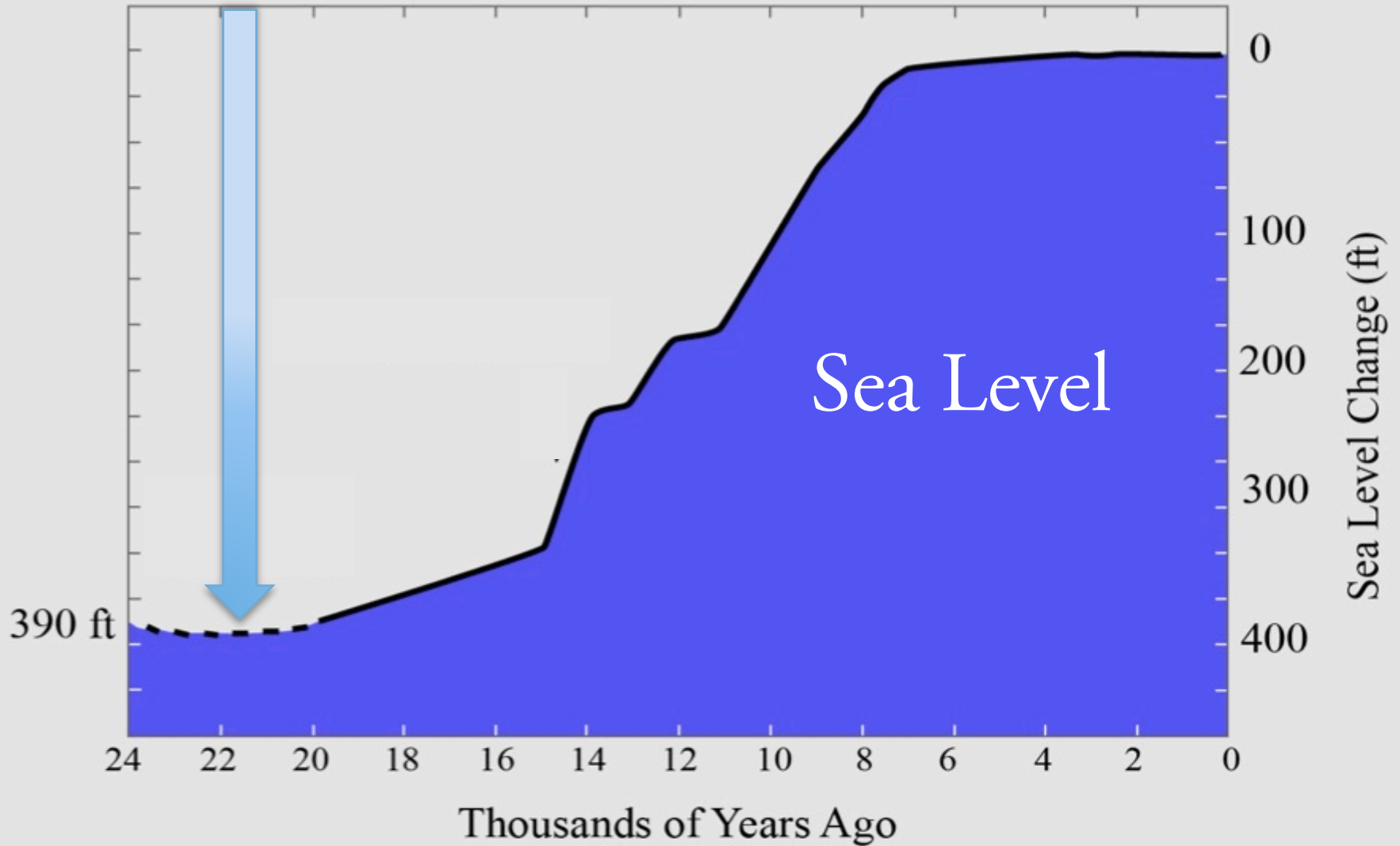






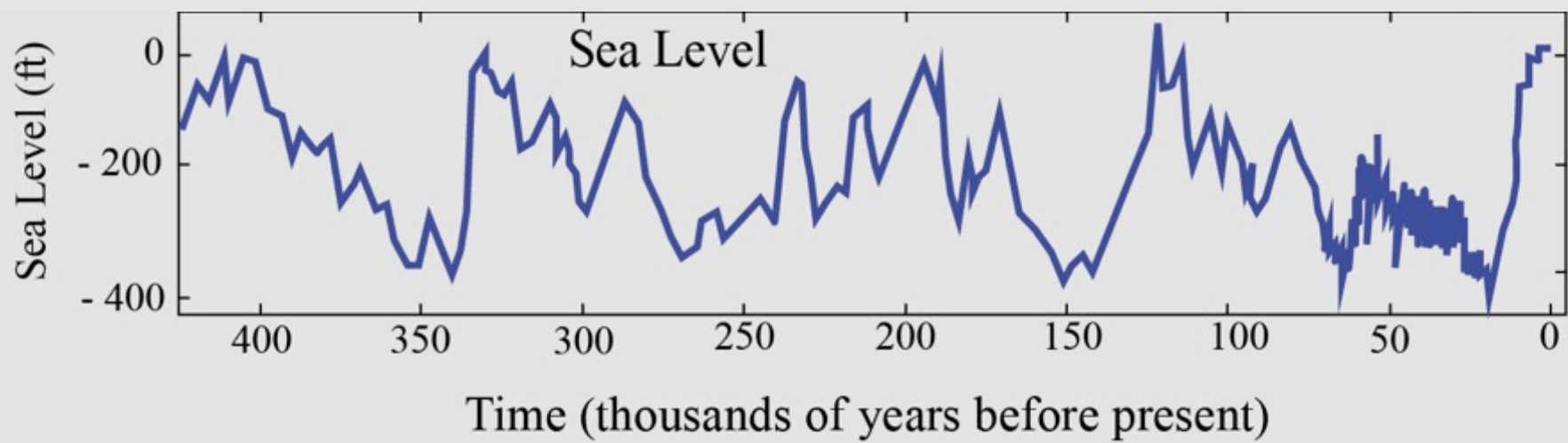
20,000 Years Ago

Last Ice Age

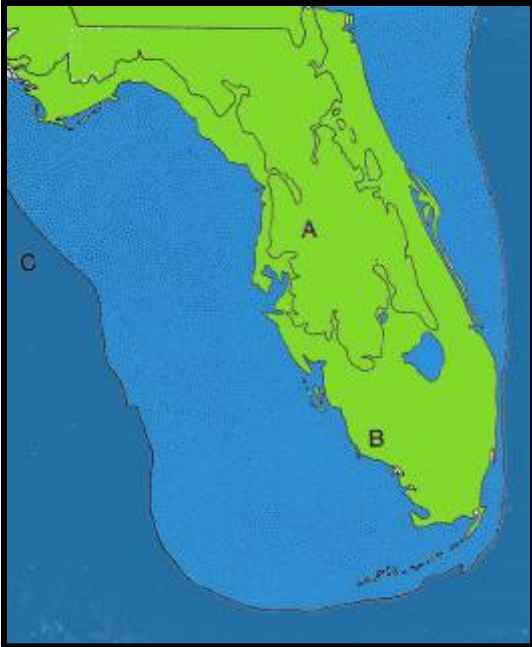




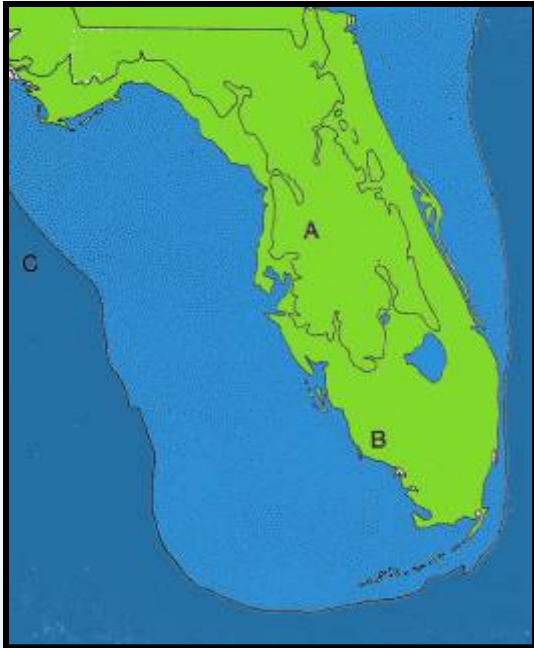
**ICE  
AGE**  
THE MELTDOWN



# Today



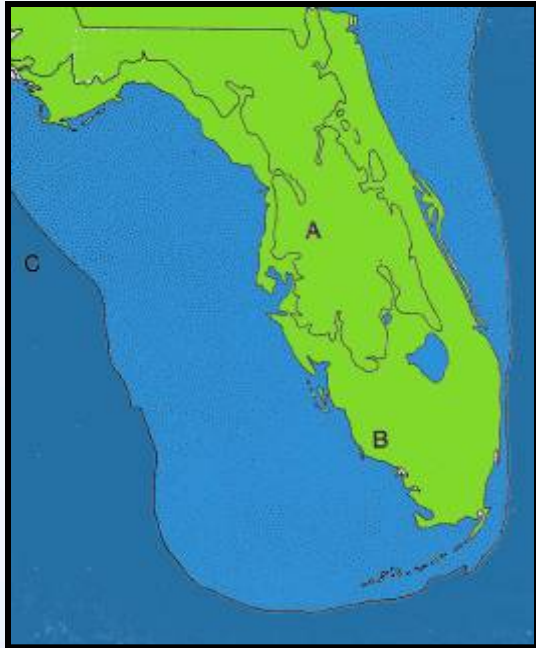
**Today**



**20,000 yrs ago**



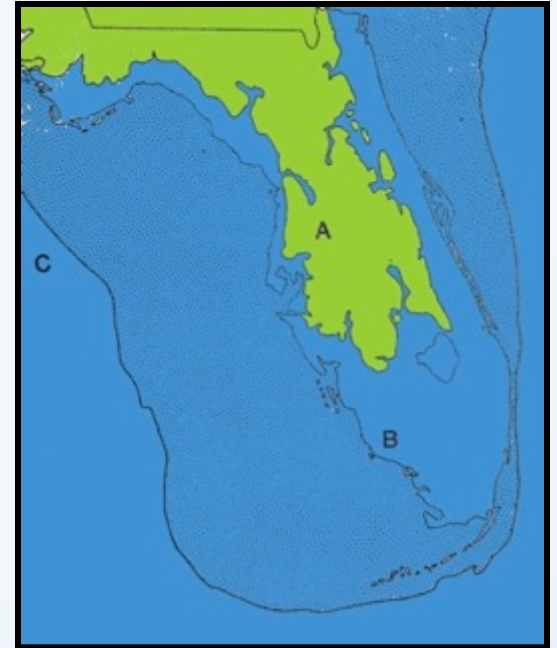
**Today**



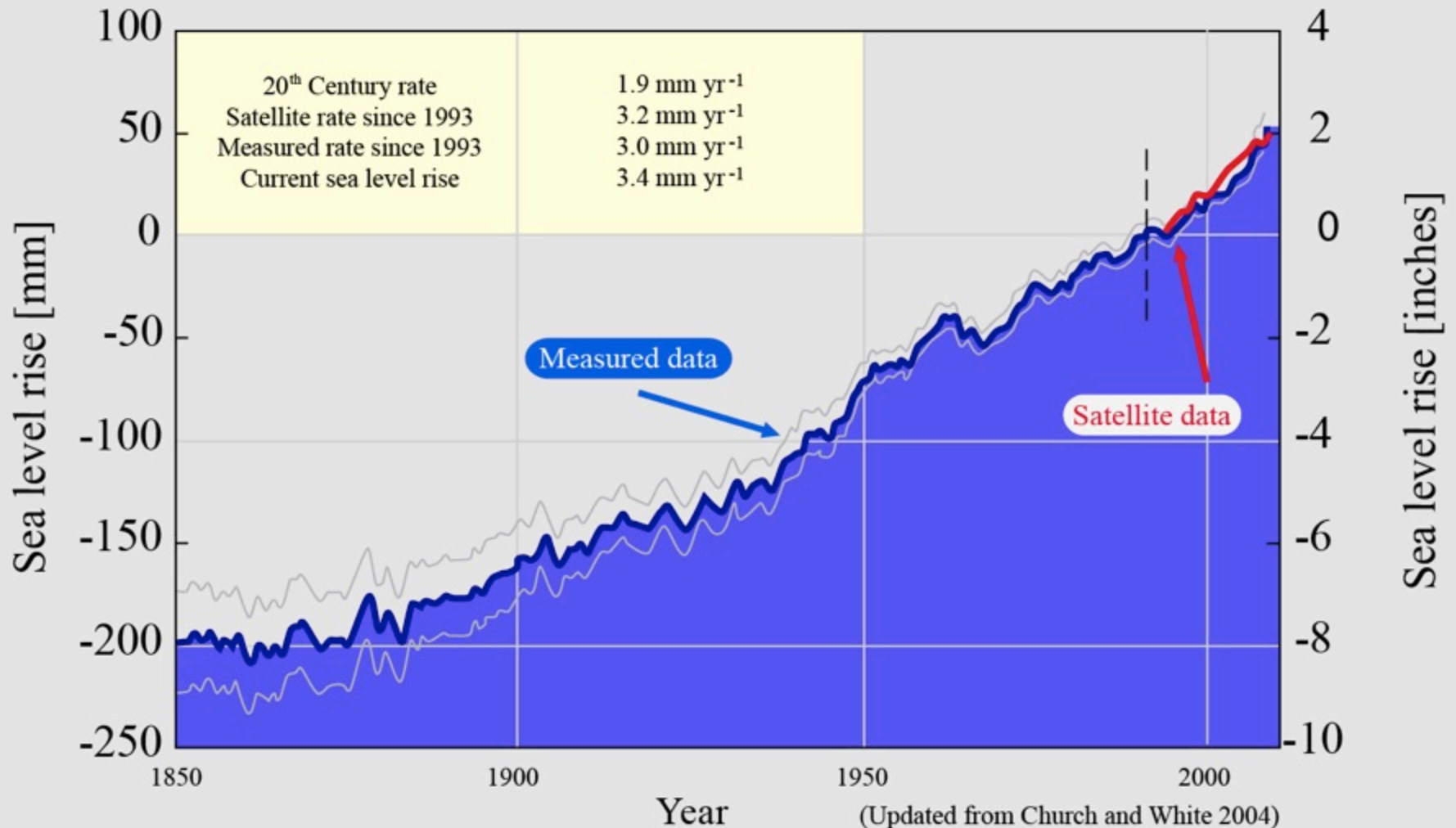
**20,000 yrs ago**



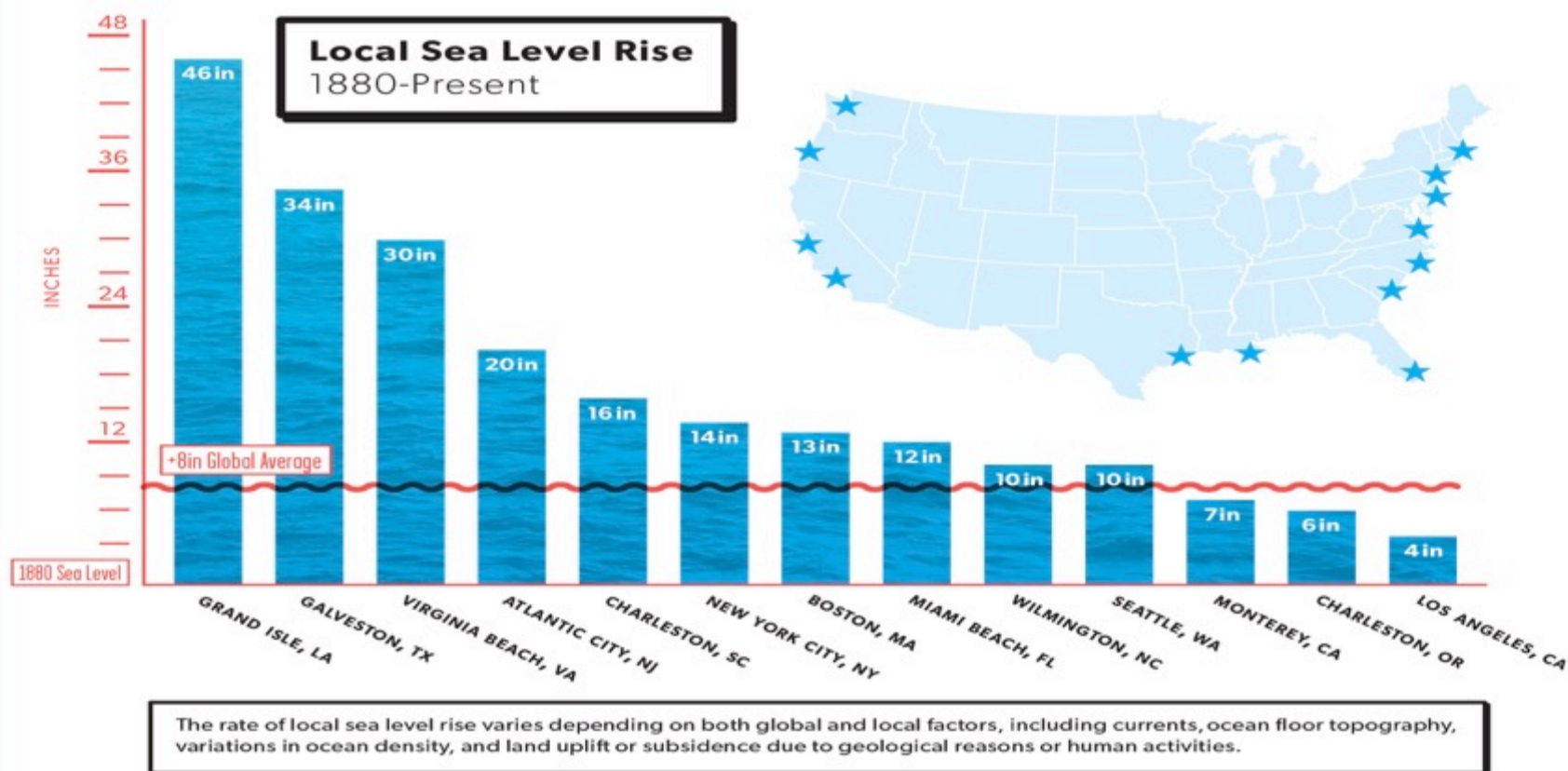
**120,000 yrs**



# Sea Level Rise: 20<sup>th</sup> Century



Global average sea level has increased 8 inches since 1880. Sea levels along the U.S. East Coast and Gulf of Mexico are rising **much faster**.





Greenland =  
24 feet of SLR

Antarctica =  
186 feet of SLR







@johnenglander

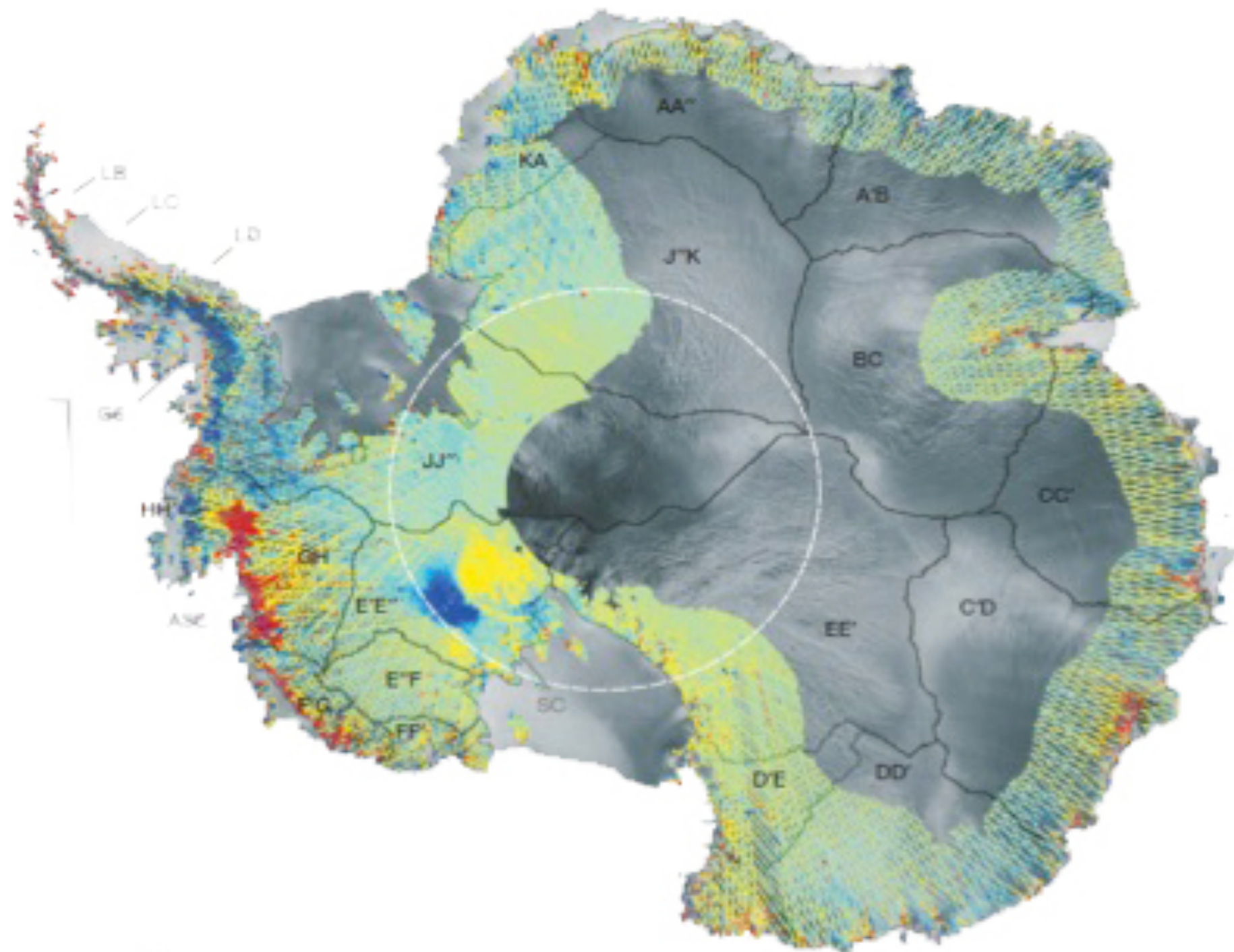


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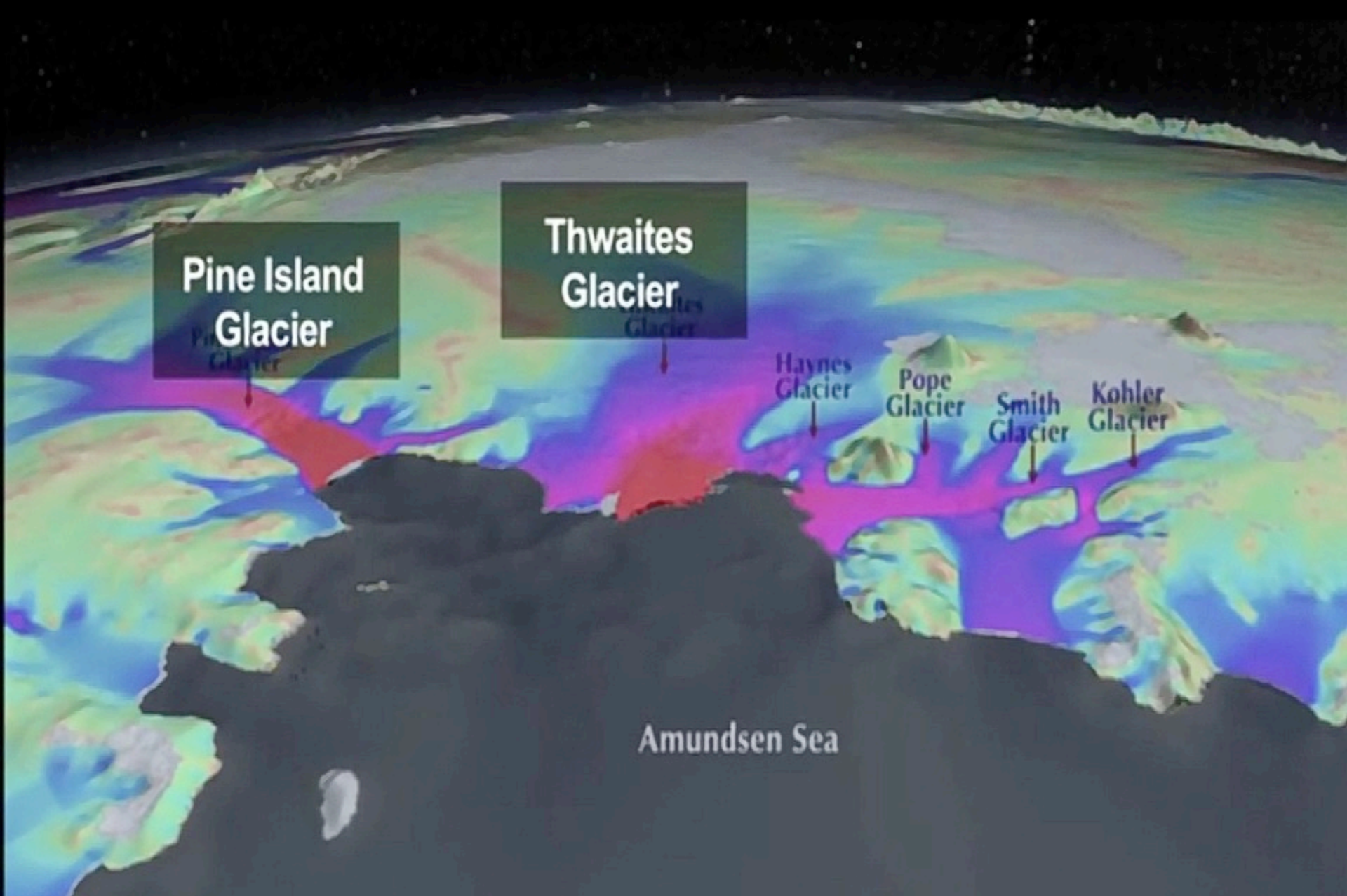


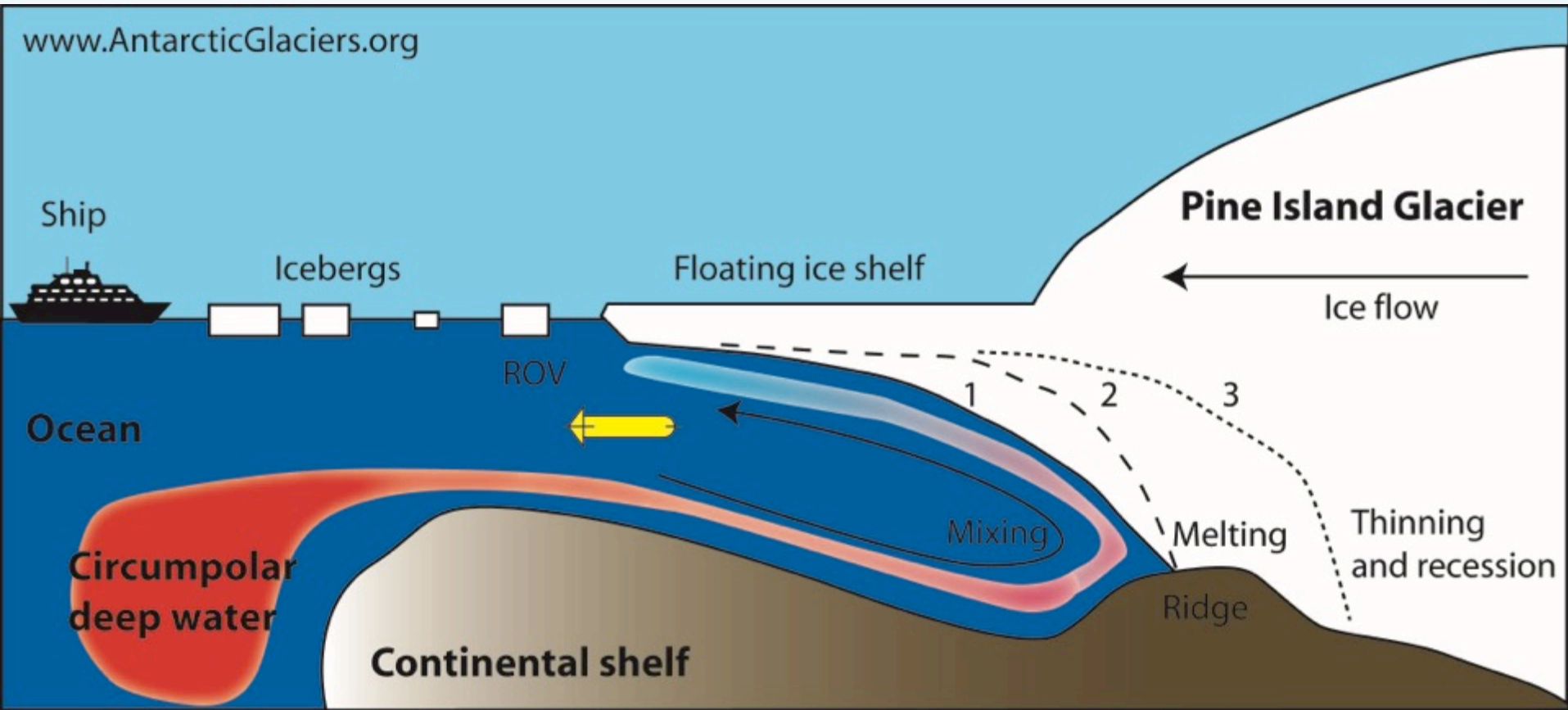
Antarctica has 7 times more ice than Greenland



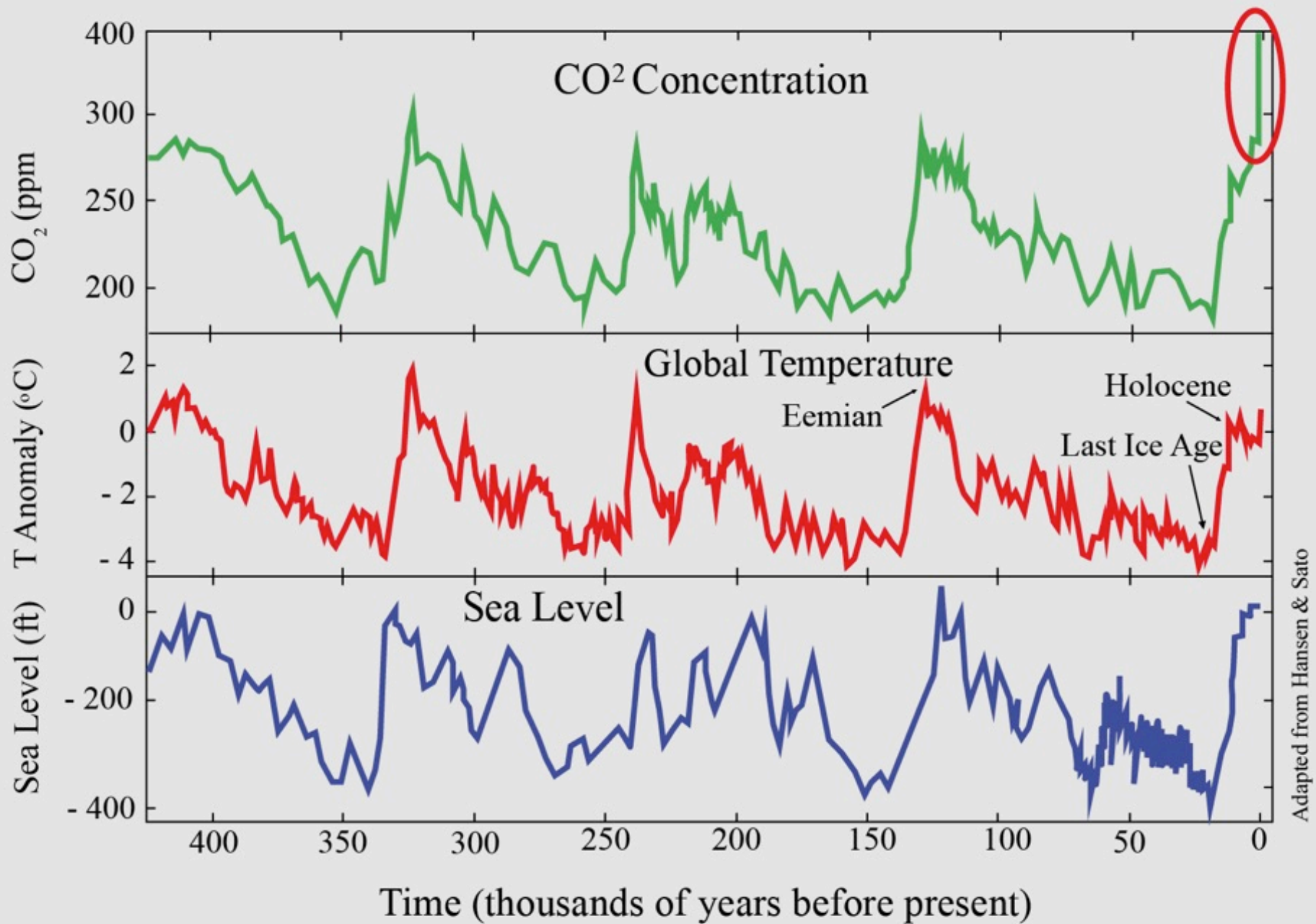


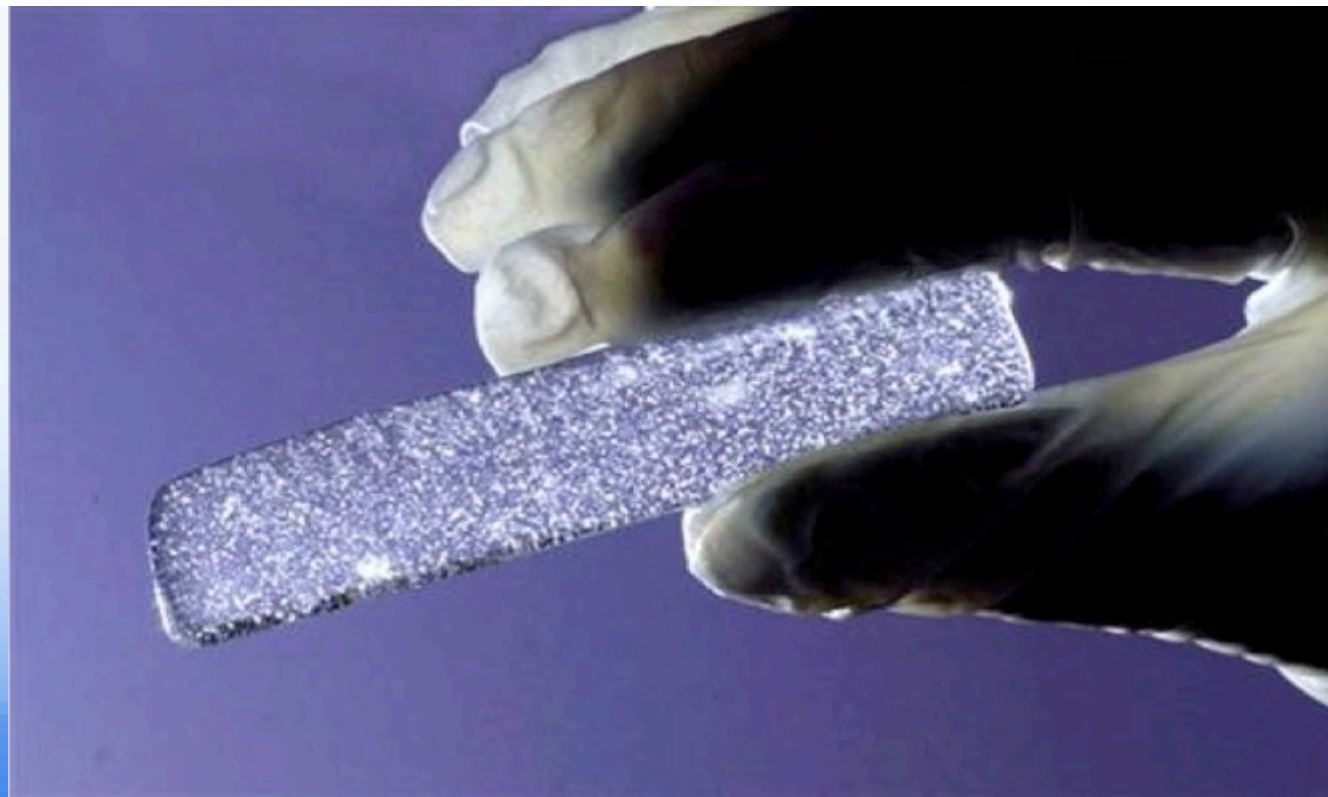
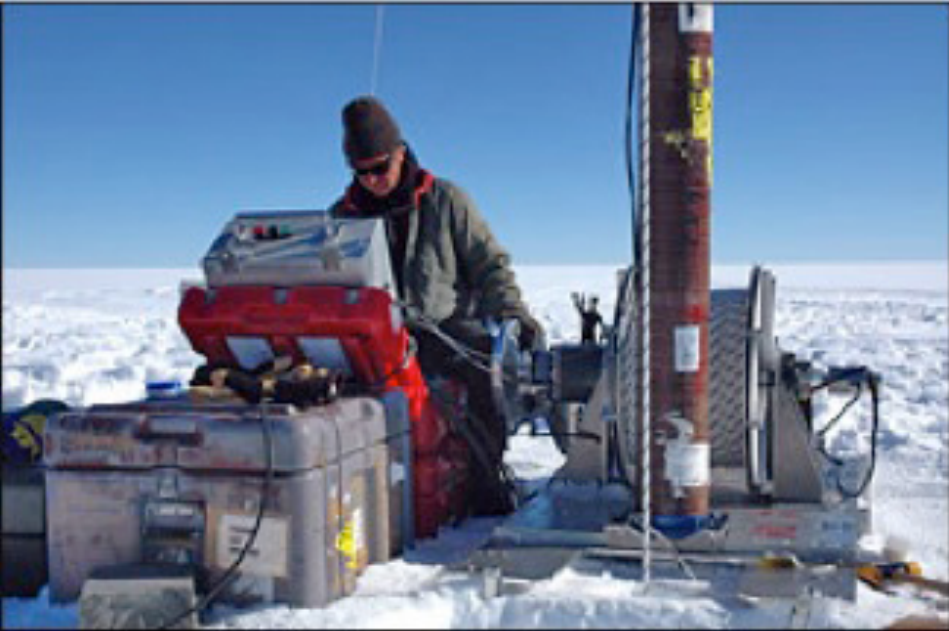
# The West Antarctic Icesheet

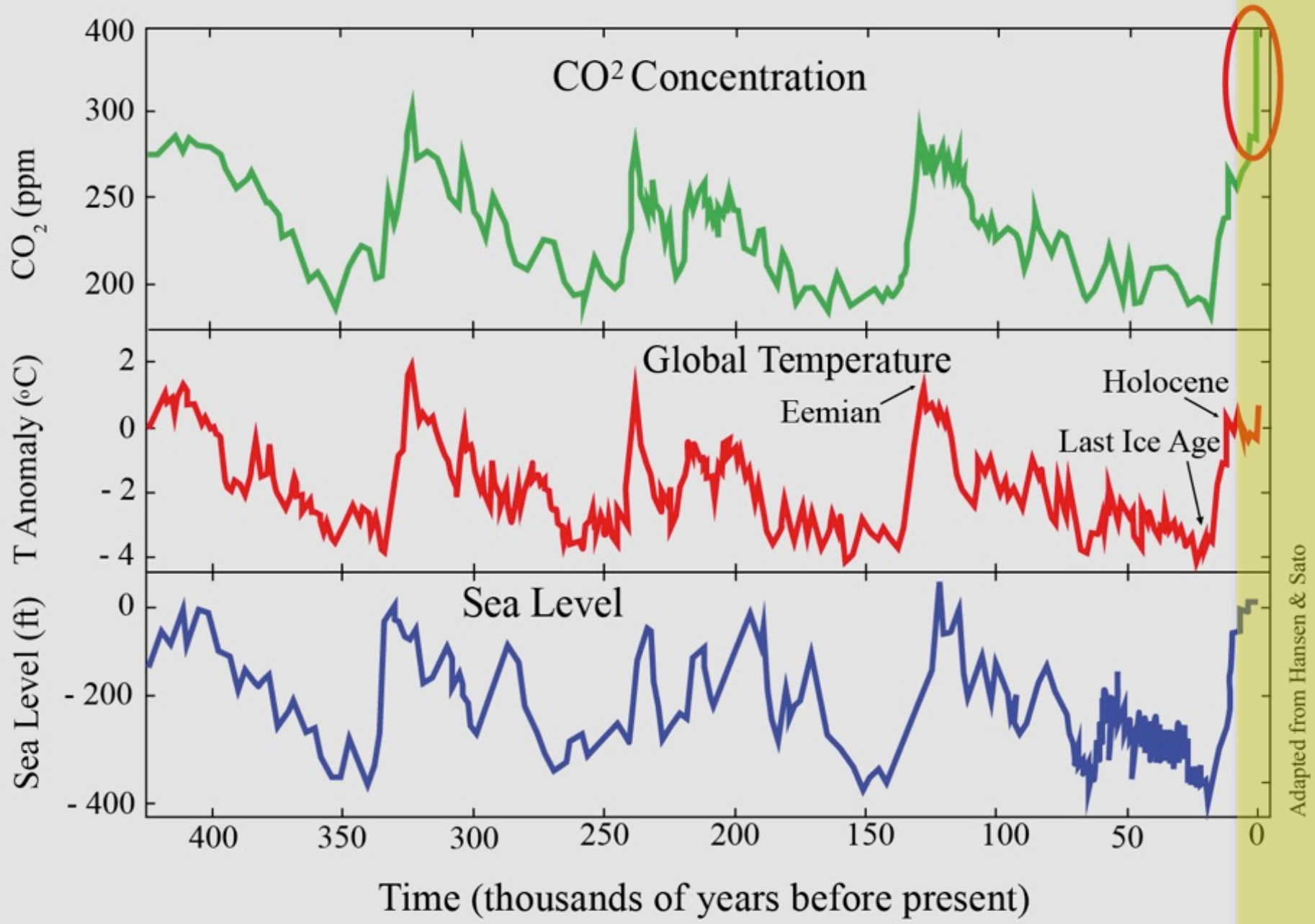




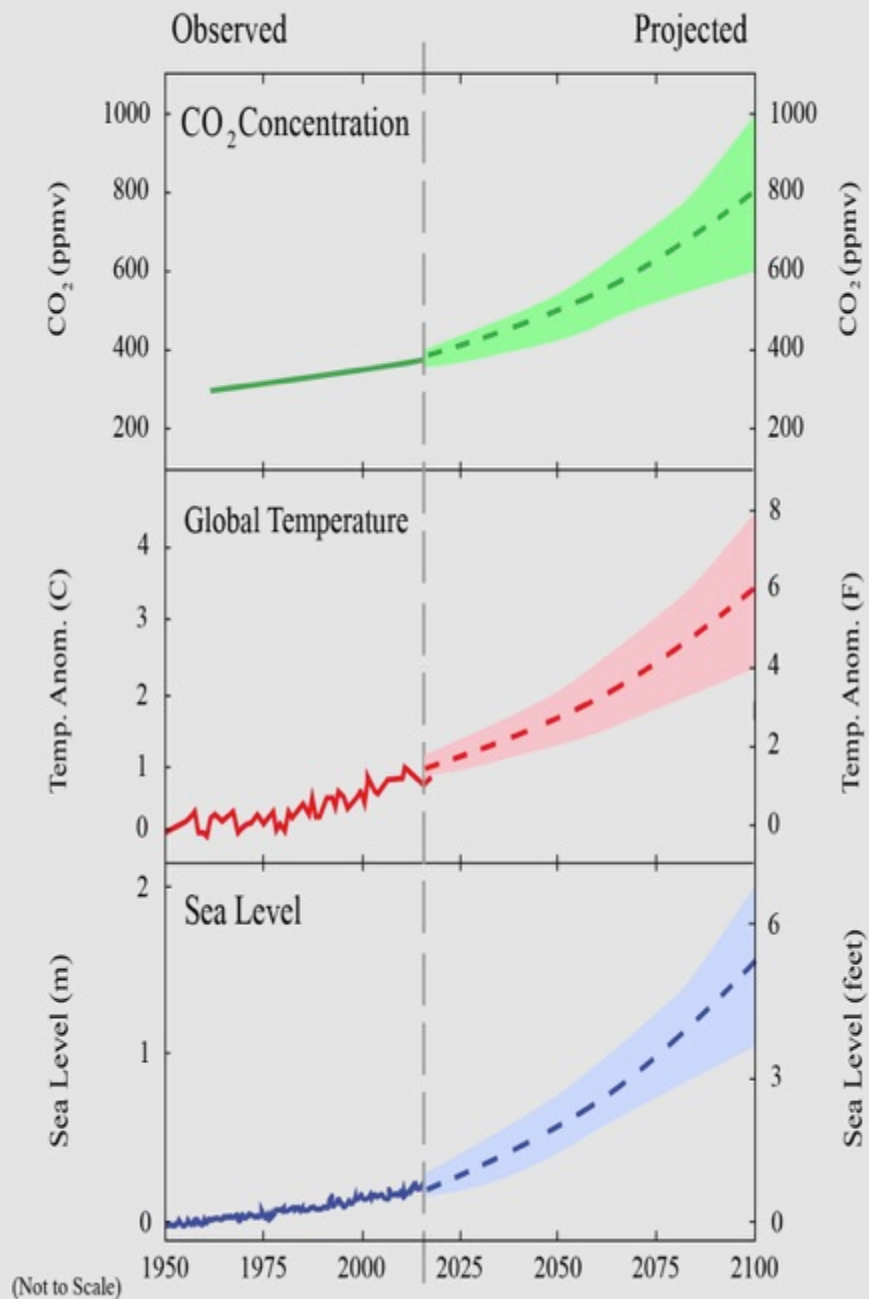
1. Early 1970s. Pine Island Glacier is grounded at a bedrock ridge.
2. Warm, inflowing Circumpolar Deep Water melts the base of the glacier. The glacier steepens and accelerates.
3. Present day, observed by a remotely operated vehicle (ROV). Glacier is thinning and receding.







Adapted from Hansen & Sato



Last half century continues the pattern:  
CO<sub>2</sub>, global temperature, and sea level are all rising

## RECAP

1. Storms, Extreme Tides, and SLR are different. SLR is slow but “permanent”
2. SLR will have different effects in different places.
3. Don’t confuse planning for SLR with reducing GHG and other efforts at being “sustainable” and green.
4. SL projections differ and change. Plan for the first 3 feet of SLR, asap.



*Planning for future generations...*



*...is our responsibility, and a great opportunity*

# INTERNATIONAL SEA LEVEL INSTITUTE



Understand • Plan • Adapt

[www.sealevelinstitute.org](http://www.sealevelinstitute.org)

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